

IN THE SPECIFICATION:

These replacement paragraphs are submitted to clarify the specification. Applicant submits that no new matter is injected into the application by way of the substitute paragraphs.

Please replace the paragraph beginning at page 8, line 4, with the following paragraph:

For uni-modal distributions, in the range 0 to 180, the peak direction mean is at an angle $\bar{\alpha}$ given by

$$\bar{\alpha} = \frac{1}{2} \tan^{-1} \frac{\sum_{i=1}^N f(\alpha_i) \sin 2\alpha_i}{\sum_{i=1}^N f(\alpha_i) \cos 2\alpha_i}$$

while the standard deviation about this mean is given by

$$\sigma(\alpha) = \left[\frac{1}{2N} \sum_{i=1}^N f(\alpha_i) (1 - \cos 2(\alpha_i - \bar{\alpha})) \right]^{1/2}$$

To describe the alignment of the fibers, ~~applicants~~ applicant uses a ratio known as the Anisotropy Ratio, f_p defined as:

$$f_p = 2\langle \cos^2 \theta \rangle - 1$$

$$\langle \cos^2 \theta \rangle = \frac{\int_0^\pi \psi(\theta) \cos^2(\theta_{ref} - \theta_i) d\theta}{\int_0^\pi \psi(\theta) d\theta}$$

Serial No.: 10/612,790

Please replace the paragraph beginning at page 9, line 1, with the following paragraph:

Most suitable, camera **12** is an analog SONY CCD or SONY digital camera; light source **14** is a high intensity LED white light source (Figs. 1A – 1D); diffuser **16** is a conventional diffuser known to those skilled in the art; beam splitter **18** is a 50/50 beam splitter; mirror **22** is a first surface mirror; and condenser lens **24** is a double concave lens. Each of the lighting arrangements in Figures 1A – 1D ~~utilize~~ utilizes a computer **C** connected to camera **12** and light source **14**. Arrangements 1C and 1D are the preferred methods.

Please replace the paragraph beginning at page 9, line 8, with the following paragraph:

Typical images for various nonwovens (carded polypropylene web; spunbonded polyester nonwoven; and polyester staple hydroentangled nonwoven; respectively) are shown in Figures 2, 3 and 4. The sample in Figure 4 is a heavy nonwoven structure weighing 200 grams per square meter (gsm). The unique feature of these arrangements is that the fibers in multiple layers appear to be in focus and can be used for samples weighing as much as 500 gsm depending upon how densified they are. The ODF can be determined by the present system by various means. Applicant's fiber orientation algorithms are based on:

Fourier Transform

Hough Transform

Serial No.: 10/612,790

Direct Tracking

Ridge Tracking

Flow Filed Analysis

Applicant prefers the Fourier Transform for determining the orientation distribution features of any image regardless of other features. It requires little or no additional steps in deriving the ODF.

Please replace the paragraph beginning at page 9, line 8, with the following paragraph:

Their data suggested that CV values are high for areas measuring 4 mm^2 and that they become insensitive to size beyond cell areas greater than 4 mm^2 . While it is expected that the variation will decrease with increasing window size, it is not clear why all samples would display similar behavior for sizes greater than 4 mm^2 . Applicant also has discovered that image average brightness may not be a valid measure of uniformity in a given cell. That is, it is possible for different images to have similar mean intensity values, but may have different degrees of blotchiness. Further, it is not clear what light source was used, how the intensity of the light source was controlled or how the system was calibrated. First order statistics (light intensity distribution, CV, etc.) are clearly affected by the illumination system used and are not reliable at all unless the system as a whole is calibrated. Additionally, video/frame grabber systems have a fixed spatial resolution and the results can therefore be valid for the spatial resolution of the system discussed. The maximum

Serial No.: 10/612,790

area such a known system would cover was said to have been 8.3 cm² (8.3 square centimeters). Viewing large areas with a macro lens assemblies can also be problematic unless appropriate flat lenses are used. Lastly, the non-uniformity spectra ~~was~~ were not used to derive a generalized index of uniformity that would be invariant to size, resolution or illumination.

Please replace the equation summary beginning at page 17, line 8, with the following paragraph:

$$P_x = e^{-\mu} \left(\frac{\mu^x}{x!} \right)$$

where

P_x = Probability of [obeserving] observing x individuals

x = An integer counter, ; 0, 1, 2, 3, ...

μ = The true mean of the distribution

$x!$ = $(x)(x-1)(x-2)...(1)$ and $0! = 1$ by definition

Please replace the paragraph beginning at page 20, line 23, with the following paragraph:

The present invention again is a combined hardware and software solution that can estimate both fuzzing and ~~piling~~ pilling and is capable of assessing changes easily and reliably. This is accomplished by controlling the angle of the incident light such that only objects raised from the surface are illuminated.